

## SERIES SEVEN

Panzerkampfwagen III (5 cm)

Ausfuhrung F (Typ 5/ZW) Sd. Kfz. 141 (GE)

M 41 155mm Howitzer Motor Carriage (US)

SU 85 Tank Destroyer (SU)

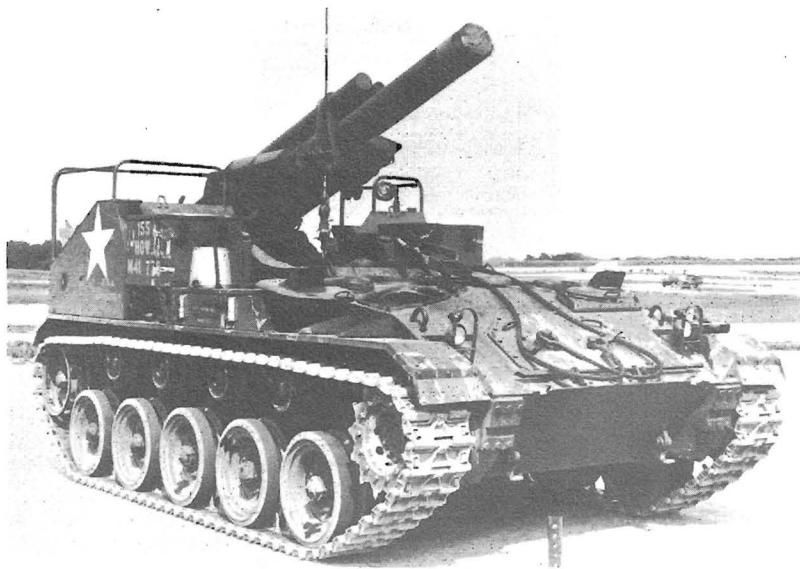
Sherman V C "FIREFLY" (US)



MILITARY VEHICLE PRINTS

BELLONA  
30p

15p



U.S. Motor Carriage 155 mm Howitzer, M.41

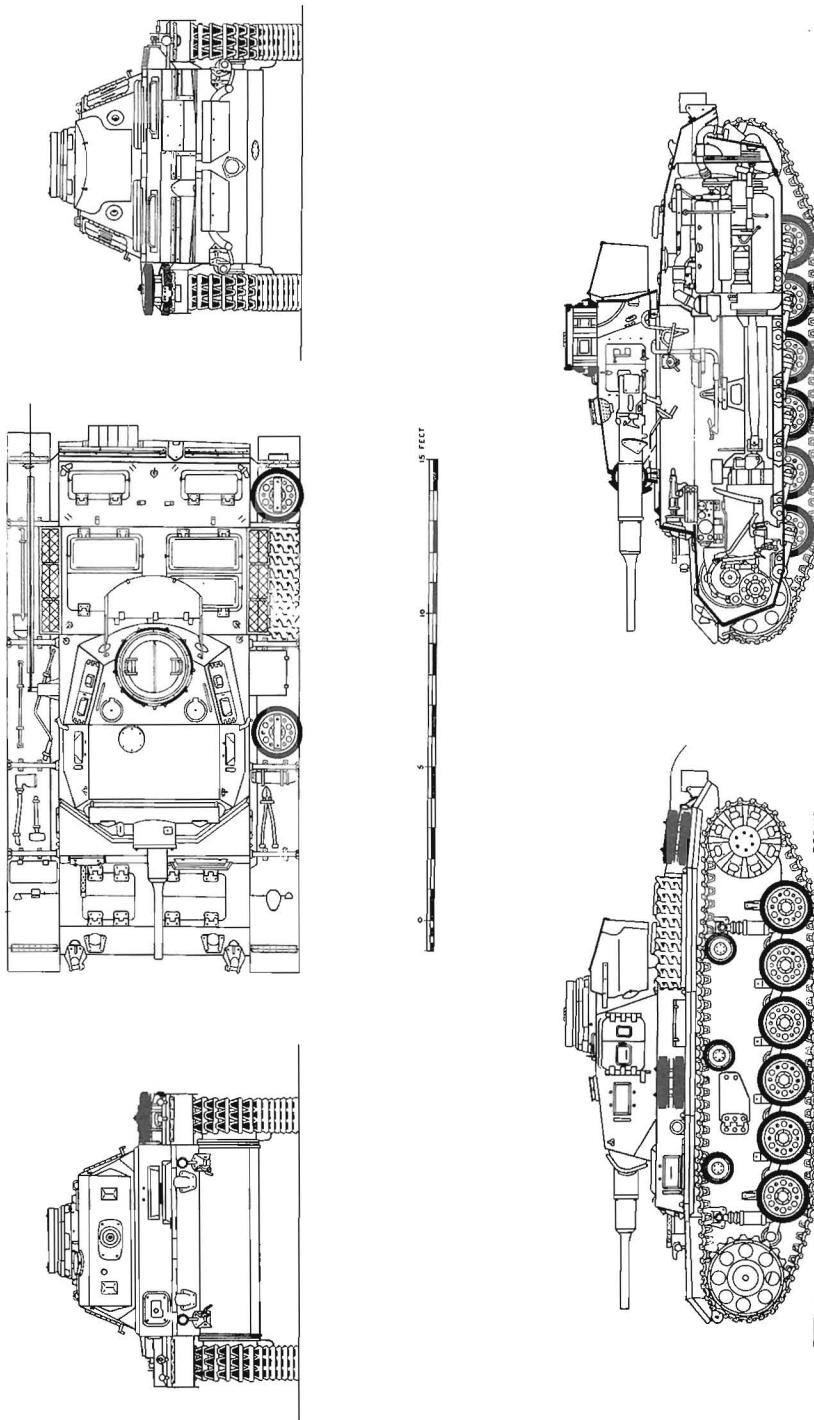
The 155mm Howitzer is mounted on the basic chassis of the light tank M.24.



PANZERKAMPFWAGEN III AUSF. 'F' (5 cm)

The pattern of the drive and idler sprockets can be seen on this photo; also note the commander's cupola.

Panzerkampfwagen III (5 cm) Ausführung F (typ 5/ZW) Sd. Kfz. 141 - 1942  
Scale 1:76 (4 mm to 1 foot). Drawn by D.P. Dyer.



Only a small number of the first four models (A to D) of the PzKpfw III were built each of which had a different suspension varying from five to eight roadwheels. Commencing with ausf E (Chassis No. 60401-60441) Typ 4/ZW was the design of torsion bar suspension that was to remain virtually unchanged throughout the remainder of the series. Through having six roadwheels and three return rollers this suspension bore the strongest resemblance to that of the prototype for the whole series, the 'Zugführerwagen' (Platoon Leaders Vehicle) or ZW as abbreviated. All PzKpfw III vehicles were given ZW numbers derived from this.

All models up to and partially including model G were originally fitted with the 3.7 cm KwK which was comparable to the British 2 pdr, but these were subsequently rearmed with the 5 cm KwK L/42 as shown in the drawing. Orders to upgun the PzKpfw III to 5 cm had been issued early in 1938 but it took 16 months before the first vehicle with this armament appeared in May, 1940, too late to see action prior to the BEF being evacuated at Dunkirk. There is however an official German reference to the fact that 40 5 cm PzKpfw III were committed during the course of the Western campaign. The first time that the British came into contact with them however was after their arrival with the DAK in Libya in February 1941.

The PzKpfw III ausf F (Chassis No. 61001-65000 Typ 5/ZW) like ausf E beforehand and ausf G afterwards was fitted with a 10 forward and 4 reverse preselector gearbox. The engine fitted to ausf E was the HL 120 TR but this was slightly modified for the ausf F and designated HL 120 TRM and continued throughout the remainder of the series.

Whilst the commanders cupolas fitted to ausf D, E and F were an improvement on earlier ones they suffered from the fact that all vision ports were uncovered at the same time due to the armour 'belts' being operated by a rotary movement. From ausf G (Chassis No. 65001-66000 Typ 6/ZW) a new cupola was used which had separate armoured covers over each vision port which could be operated independently.

Although the front plates of ausf E, F and G were subsequently reinforced by appliqué armour, additional 30 mm armour was factory fitted as from ausf H (Chassis No. 66001-68000 Typ 7/ZW) which also had a simpler 6 Forward 1 reverse gearbox without preselector. As from this model the track width was increased from 360 mm to 400 mm, and different drive sprockets and idlers were fitted. (See StuG IID Bellona prints series 6. This also shows the different spacing of the front return roller and later design of shock absorbers).

In August 1940 Hitler ordered that the PzKpfw III should be fitted with the more powerful 5 cm KwK 39 L/60 that was under development. Although this weapon could have been ready for quantity production in April 1941 the Ordnance Department decided for reasons of standardisation to retain the 5 cm L/42 in the new models which had appeared to be adequate up to that time. Hitler was furious when he found that his orders had not been obeyed, as it took a further year for the L/60 to appear on production vehicles by which time it was too late as the Russian T.34 already outclassed every vehicle on the Eastern front. It was directly due to this incident that Hitler took a more direct hand in all future tank development.

Early production vehicles of ausf J (Serial No. 68001-69100) Typ 8/ZW) whilst having increased basic armour of 50 mm necessitating a different type of driver's vision port and bow m.g. mounting were still mounted with the 5 cm L/42. Serial No. 72001 to 74100 were fitted with the 5 cm L/60 and were known to the British as J Specials and will be the subject of a later Bellona print.

#### Technical Details

Crew, 5

Weight, 20 tons

Performance; Speed Max Road 25 mph (40 kph)

Cross Country 11 mph (18 kph)

Max Gradient 30 degrees

Fording Depth 31 $\frac{1}{2}$ " (80 cm)

Trench Crossing 7 $\frac{1}{2}$ " (230 cm)

Obstacle Height 1 $\frac{1}{2}$  $\frac{1}{2}$ " (6 cm)

Range 109/60 miles (175/97 kilometres)

Fuel capacity 72 gals (327 litres)

Dimensions; Length overall 17 $\frac{1}{2}$ " (541 cm)

Width overall 9 $\frac{1}{2}$ " (292 cm)

Height to top of cupola 8 $\frac{1}{2}$ " (251 cm)

Ground Clearance 15 $\frac{1}{2}$ " (38 cm)

Track Contact 9 $\frac{1}{2}$ " (286 cm)

Track Width 14 $\frac{1}{2}$ " (36 cm)

Fire Height of Gun 6 $\frac{1}{2}$ " (190.5 cm)

Track centres 8 $\frac{1}{2}$  $\frac{1}{2}$ " (205 cm)

Turret Ring Dia. 5 $\frac{1}{2}$ " (160 cm)

Engine; 1 x Maybach HL 120 TRM (built by Maybach and Norddeutsche-Motorenbau) V-12 Watercooled, Petrol, 300 bhp at 3,000 rpm.

Armour; Nose 30 mm at 21 degrees

Drivers Plate 30 mm at 9 degrees

Side 30 mm vertical

Rear 21 mm at 13 degrees and 10 degrees

Top of Hull 17 mm Horizontal

Belly 16 mm Horizontal

Turret Front 30 mm at 15 degrees

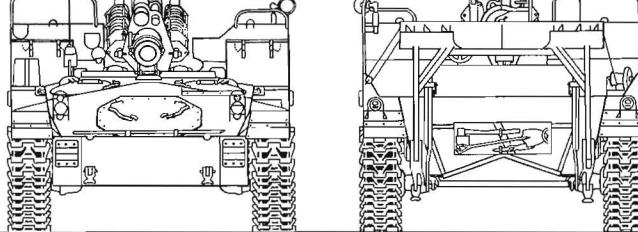
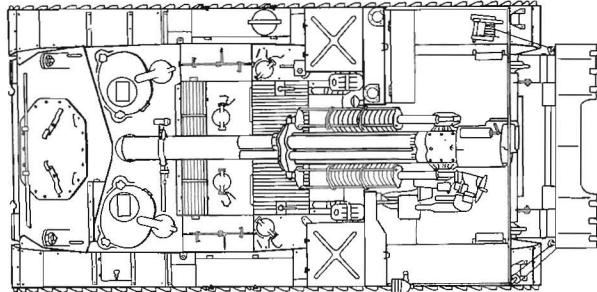
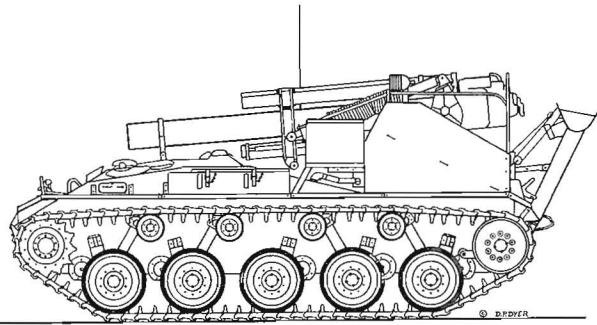
Turret Sides 30 mm at 25 degrees

Turret Rear 30 mm at 12 degrees

Turret Top 10 mm at 83 degrees and horizontal

Ammunition Stowage; 50 mm 99 rounds

7.92 mm 2,000 rounds



0 5 10 15 FEET

155mm Howitzer Motor Carriage M41 - 1945  
Scale 1:76 (4mm to 1 foot). Drawn by D. P. Dyer

In order to increase the mobility of the standard American 155 mm Howitzer M1, maximum self propelled gun carriage was produced utilising a lengthened M5A1 Light Tank Chassis which was designated the 155 mm Howitzer Motor Carriage T64. Before this was passed for production the M5A1 light Tank was superseded by the M24 Light Tank (Bellona Prints, series 5) and development proceeded with a modified design the T64E1 which utilised the chassis of this latter vehicle. Production commenced shortly before the end of World War II and the vehicle was known as the 155 mm Howitzer Motor Carriage M41, the unofficial name for it being Gorilla.

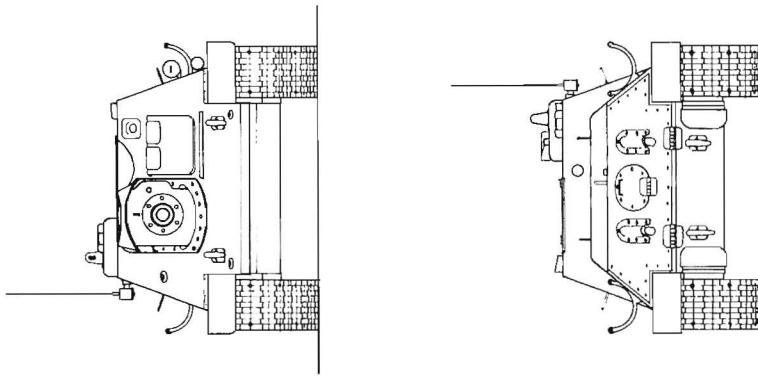
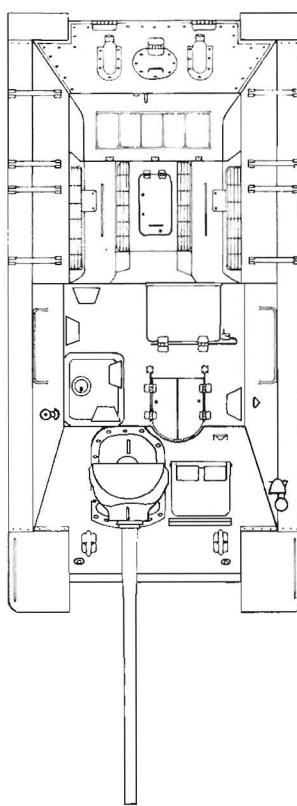
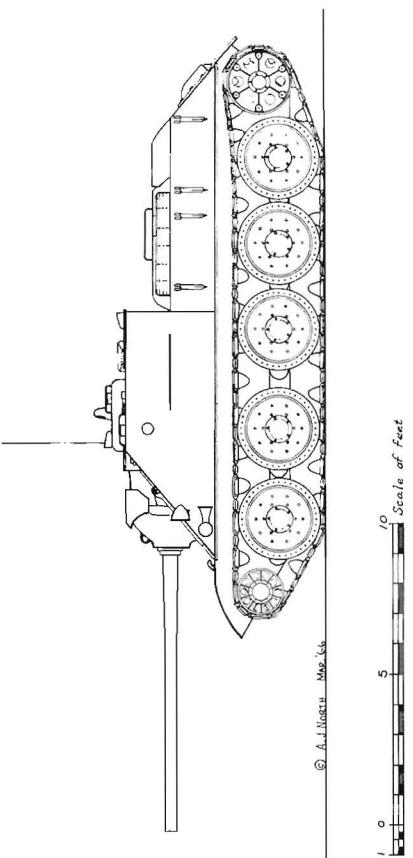
It followed American practice at that time with regard to the chassis layout of heavy self propelled guns, in as much as the driver and co-driver's compartment was at the front with the engine compartment directly behind them, and the gun at the back. The gun compartment itself had very little protection. There was a manual winch-operated recoil spade at the rear, the firing platform lowering down to rest on this for the gunners. The drawing shows the firing platform and spade folded up in the travelling position together with the howitzer in its travelling lock.

A very similar chassis was utilised to mount a 360 degree traverse open turret mounting twin 40 mm guns. This was the first fully tracked American self propelled AA gun carriage and was designated the M19.

The 155 mm HMC M41 was organic to artillery units of American armoured divisions until the mid 1950s, when it was replaced by the 155 mm HMC M44.

Technical Details

Combat Weight, 42,500 lbs. (19 tons British, 21½ tons American, 18.7 Tonnes)	Suspension, torsion bar with compensating idler
Crew, 12 (Eight of these transported separately)	Transmission, hydramatic
Manufacturer, Cadillac	Steering, controlled differential
Road Speed, 30 m.p.h. (49 kph)	Armament, one 155 mm Howitzer M1, maximum range 16,350 yards (9 miles - 15 kilometres)
Fuel, 98 gals British (110 gals American, 444½ litres)	Calibre, length 25
Range, 96 miles (154½ kilometres)	Elevation, minus 5 degrees to plus 45 degrees
Trench Crossing, 9 feet (3.28 metres)	Traverse, 17 degrees left to 20 degrees right
Obstacle Height, 40 inches (101.6 cm)	Separate loading ammunition
Fording Depth, 42 inches (106.7 cm)	Projectile weight, 95 lb (43 kilograms)
Armour, ½ inch (12.7 mm)	Rate of fire, first ½ minute 2 rounds; prolonged fire 40 rounds per hour
Engines, two Cadillac V.8., liquid cooled, petrol, each developing 110 b.h.p.	



SU 85 Tank Destroyer - 1944  
Scale 1:76 (4 mm to 1 foot). Drawn by A.J.D. North

Following the successful employment by the Germans of specialised tank destroyers, the Russians were quick to exploit a similar idea when they mounted their then new 85 mm anti-tank gun in the chassis of the highly successful T 34 tank. The year was 1944 and the victorious Russian armies were already forcing back the Germans on all fronts.

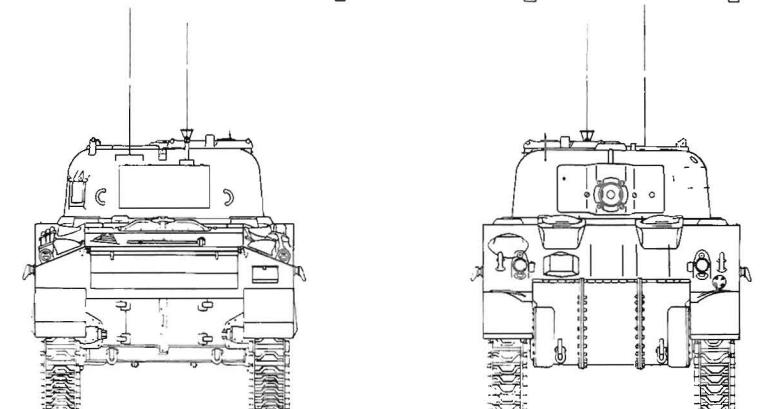
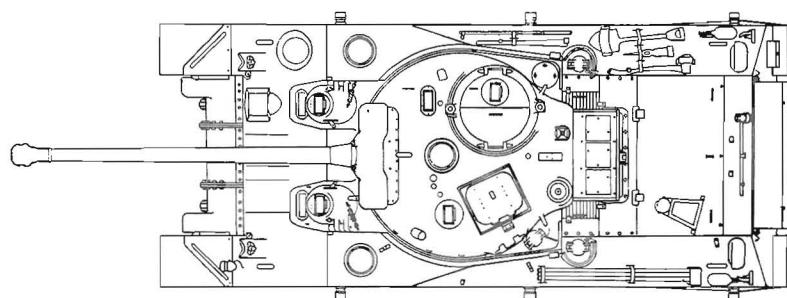
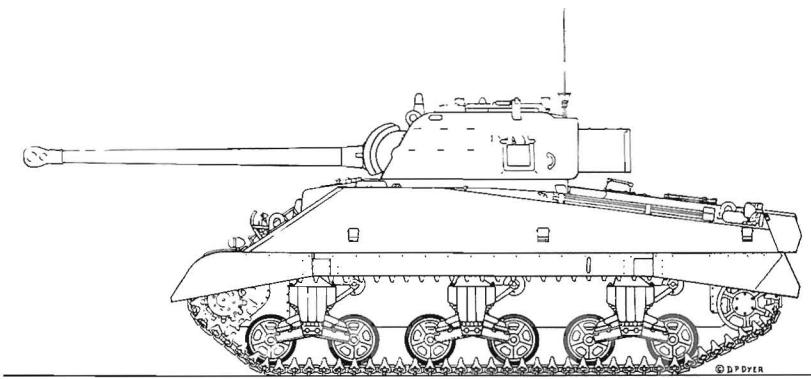
Essentially, the SU 85 incorporated a gun of limited traverse in a heavily armoured fighting compartment built ahead of the engine, where the turret was mounted on the T 34. The silhouette was appreciably lower than that of the T 34 at the expense, of course, of the advantages of a turret. At the time of the SU 85's introduction, however, the improved T 34/85 was only just entering service, so the SU 85 provided a powerful addition to the 'punch' of the Red Army tank regiments still armed with T 34/76 tanks.

Service life of the SU 85 was, however, relatively short, as an improved SU was very quickly developed, basically similar to the 85 but mounting the heavy 100 mm anti-tank gun. This vehicle, the SU 100, was first introduced into service in 1945 and soon displaced the SU 85 as the standard Russian tank destroyer. The SU 85s found their way into satellite armies or were converted to unarmed recovery vehicles or command tanks.

The SU 100 has already been featured in a Bellona drawing, No. 6r, and immediate differences which can be seen by comparing the drawings include the noticeably shorter gun on the SU 85 and the cupola positions. On the SU 100 this protrudes through the side of the vehicle, while on the SU 85 it protrudes through the front plate. Other features are similar to those of the SU 100 and the T 34/85. One other S.P. vehicle based on the T 34 chassis was the SU 122, mounting a 122 mm gun.

#### Technical Details

Engine 500 h.p. V - 12 diesel;  
Max speed 35 m.p.h. (road);  
Fuel 80 gals;  
Endurance 186 miles;  
Fording depth 2 ft. 11 ins;  
Weight 29.6 tons;  
Gun 1 x 85 mm, 48 rounds;  
Armour: front 45-75 degrees; top 20mm; remainder 45 mm;  
Crew 4;  
Gun elevation - plus 20 degrees, minus 3 degrees.  
All other details as for SU 100 given on Bellona Print series 2, No. 6r.



1 0 5 10 15 FEET

Sherman VC Firefly - 1944  
Scale 1 : 76 (4 mm to 1 foot). Drawn by A.J.D. North

Although the 17pdr had been developed primarily as an anti tank gun to replace the 6pdr it's use as a tank gun was envisaged when the design was first discussed in 1941. The turret ring diameters of British tanks at this time were all too small to contain it however, and the A.30 Challenger which was built to take it proved unsatisfactory.

In view of the powerful gun and heavy armour of the German Tiger when it appeared it was imperative that the 17pdr be brought into use as a tank gun as soon as possible. The suggestion of fitting it on Shermans was at first rejected as impossible, but it's feasability had been proved by the summer of 1943. Vehicles modified in Britain were in time to take part in the Invasion of Europe and played an important role up until the end of hostilities.

The A/P performance of the 17pdr was superior to all German tank guns other than the 88mm L/71 fitted to the Royal Tiger, but firing APDS shells even this gun could be bettered except at extreme ranges. The Germans developed a tungsten cored shot for the 88mm L/71 which had the edge on the 17pdr firing APDS shot but this was so scarce it was only encountered on rare occasions. So great a respect did the Germans have of the 17pdr that orders were issued to seek out and destroy Fireflies before Shermans fitted with 75mm guns. Whilst the 17pdr was primarily a high velocity anti tank gun firing solid shot a H.E. round had been developed for it by 1944 which increased it's usefulness against 'soft' targets.

Research has failed to find the number of various marks of Shermans converted to take the 17pdr, but of these it would appear that conversions of the M4A4 Sherman V were the most numerous. This is the version drawn and points to notice which would be similar on all models are as follows:- 1) Removal of bow mg and blanking of aperture due to the assistant driver being dispensed with in the interests of greater ammunition stowage. 2) Loaders hatch fitted on turret roof due to length of breech mechanism making it difficult for him to utilise cupola, especially in the event of a rapid exit being required. 3) Armoured box welded to outside rear of turret containing radio to save space inside turret. 4) Stowage box fitted at rear.

A travelling gun lock was originally fitted centrally at the rear of the vehicle. This was moved to the position shown as in the original position the wireless box made it impossible for the driver to enter or leave the vehicle with the gun barrel clamped. A field modification carried out on a large percentage of Fireflies was the fitting of a front travel lock to enable the gun to be brought into action faster. These front gun locks appeared as did most field modifications in various designs.

The three brackets appearing each side were fitted to a great number of Fireflies but their use is obscure. Similarly many were also fitted with outrigger brackets at the front from inside the front mudguards and despite various suggested uses their real use has not been established.

As this is the M4A4 Sherman the hull is longer than Sherman I - IV due to the size of the Chrysler multibank engine fitted. Owing to the increasing length the bogies are spaced wider apart than on the other models mentioned. The layout of the engine cover plates can be compared to the M4 Sherman I layout as shown in Bellona prints Series 5.

#### Sherman VC - 1944 Specification

Crew, 4	Armament
Weight, 34½ long tons (39 short tons)	1 x 17 pdr 76.2 mm L/60 Mk 1V
Performance; Speed Max Road 22½ mph (36 kph)	Muzzle velocity 2950 fps, 3950 fps
Cross Country 10 mph (16 kph)	with Armour Piercing Discarding
Max Gradient 30 degrees	Sabot Ammunition.
Fording 42" (106 cm)	1 x .30 cal Browning Co-Axial mg
Trench 8' (244 cm)	1 x .50 cal mg A/A
Step 24" (61 cm)	Ammunition Stowage; 78 rounds 17 pdr
Range Road 125 miles (201 km)	5000 rounds .30 cal
Cross Country 50 miles (85 km)	500 rounds .50 cal
Dimensions; Length overall 25'6" (777 cm)	Armour; Hull rolled homogeneous steel welded
Width 9'6" (290 cm)	Turret Cast homogeneous steel
Height 9'4" (285 cm)	Hull front 2" x 56 degrees (51 mm)
Ground Clearance 16" (41 cm)	Sides 1½" vertical (38 mm)
Mechanical Details	Rear 1½" at 20 degrees and vertical (38 mm)
Engine; Chrysler A57 30 cylinder petrol	Top 3" at 83 degrees to 90 degrees (19 mm)
liquid cooled multibank developing	Floor 1" front, 1" rear (25/13 mm)
425 hp at 2850 rpm	Turret Front 3" at 30 degrees (76 mm)
Gearbox; Synchronesh 5 forward 1 reverse	Turret Sides 2" at 5 degrees (51 mm)
Steering Controlled Differential	Turret Rear 2" vertical (51 mm)
Suspension Vertical Volute Spring	Turret Top 1" horizontal (25 mm)
	Manufacturer; Detroit Tank Arsenal converted in U.K.



An SU85 captured by the Germans and employed by them on the Russian Front. Mottled sand finish with crosses (Warpics photo)



Front view of Sherman VC Firefly, showing the blanked off machine gun position, spare track shoes, and long 17pdr gun.

## Weapons from World War II - No. 1

Japan.

90 mm mortar, model 94

One of the largest conventional mortars used by the Japanese Army in World War II was the model 94, introduced in 1934. Main recognition feature of this weapon was the pair of recoil cylinders fitted each side of the barrel. A large oblong, vaned base-plate was used and the bipod was of conventional type. The barrel was smooth-bore and had a fixed firing pin at the bottom to detonate the firing charge in the bomb. Barrel was  $51\frac{1}{2}$  inches long and the equipment had an overall weight of 340 lbs. The range extended from 612 to 4,155 yards. Though an efficient weapon, the model 94 was far too heavy for a mortar of this calibre. It required a large crew to manhandle the component parts.

In view of this, the Japanese developed an improved weapon of the same calibre. This was the model 97 (1937) mortar, similar in all respects apart from the absence of recoil cylinders and lighter bipod components. The great advantage of this later weapon was the saving in weight bringing the total down to 220 lbs. As such, the new weapon proved most effective in jungle warfare, its deadly results being well-known to anyone who served in the Pacific or SE Asia theatres.

Key to parts: 1 - base-plate; 2 - yoke, holding recoil cylinders; 3 - recoil cylinders;  
4 - muzzle; 5 - traversing screw; 6 - elevating handle.

## Weapons from World War II - No. 2

Japan.

20 mm anti-tank rifle, model 97 (1937)

The model 97 a/t rifle equipped the heavy weapons (support) platoons attached to Japanese rifle battalions. Normal establishment was 8 rifles. The rifle could fire as either a semi- or a full-automatic piece. Like the Bren gun, it was gas operated, air-cooled, and magazine loaded. There is also a bipod and a compensator. The weapon could traverse through 45 degrees by swinging the butt. Total weight was 150 lbs. and the gun could be carried by two men. For longer distances, however, carrying handles were supplied which were attached at each end of the cradle. Four men could then carry it. Total range (effective) was 1,100 yards and the sight was a fixed V-type. Two men - a firer and a loader - were needed to operate the weapon. A small shield was sometimes fitted to the front end of the cradle. This anti-tank rifle was not really effective against modern tanks, but it was still useful for strengthening an infantry company's fire-power. It was sometimes inaccurately called a machine cannon.

Key to parts: 1 - butt; 2 - safety catch (locks bolt); 3 - magazine release; 4 - detachable seven-round magazine (HE or AP rounds); 5 - barrel lock; 6 - compensator.

